as large as it used to be, and the publication of rubbishy papers is all too common. Yet, on the other hand, we fear the conscientious tyro will be overwhelmed with all the pitfalls recorded, and perhaps it is not enough emphasised that known parasites when present are easily recognised, and even each new parasite as it is discovered has such definite characters that, as a rule, the question of its parasitic nature is not a very difficult matter.

The existence of kala-azar in the eastern Sudan is a serious condition, for the disease may assume epidemic proportions. Unfortunately, at present little can be effectively done, as the mode of transmission is unknown, nor is treatment of much avail.

We have noted some of the longer and more important articles, but there is a medley of other matter. Worthy of note is the successful treatment by vaccines of two cases of "Veldt Sore." "Tropical Ulcer" seems to be rare, but the condition known as Oriental sore is not uncommon. There are in addition several articles on different aspects of tropical sanitation.

The amount of matter reviewed in the supplement is amazing, and the labour involved must have been very great. We gather from the introduction, however, that this will be its last appearance. While we shall regret its disappearance, yet we feel that the authors are quite right and absolutely justified in their decision.

Volume B, General Science, like Volume A, deals with a medley of subjects: water and soil analysis, research into gum and its relation to bacteria, entomology—it may be noted that a successful larvicidal fish has not yet been found—economic ornithology, poisonous snakes and scorpions, plant pests, municipal engineering, gold-mining in ancient times, and anthropology. The two papers on this last subject are perhaps of the most interest to the general reader, viz. that on tribal customs of the Nyam Nyam and Gour peoples, and that of the Divine Kings of the Shilluk. They are both extremely interesting, but may occasionally shock the hypersensitive. Our illustrations are taken from these two papers.

The volumes are, as usual, profusely illustrated with coloured plates, maps, and text figures, and there are complete indices.

We must express our astonishment at the amount of work done. We feel that the authors give too much of themselves, and that they are overtaxed. Undoubtedly the staff should be increased, and each member be allowed to devote himself to special subjects. It is quite impossible, if the best results are to be got, for a person to be a "factotum."

NOTES.

We are glad to learn that the preparation of a Life of Lord Lister is contemplated. We are asked to say that any letters of scientific interest forwarded to Mr. R. J. Godlee, 19 Wimpole Street, London, W., will be gratefully received for this purpose. If desired, the letters will be returned, after being copied.

It is announced in *The Times* that the Amsterdam General Radium Company has purchased the entire present stock of radium of the Austrian Government.

Lieut.-Colonel D. Prain, F.R.S., director of the Royal Botanic Gardens, Kew, has been elected a foreign member of the Royal Swedish Academy of Sciences, in succession to the late Sir Joseph Hooker.

An interesting collection of photographs by Mr. G. R. Ballance, of St. Moritz, Switzerland, illustrating the scenery on the frontier of Switzerland, France, and Italy, is on view at the Royal Photographic Society's house, 35 Russell Square, W.C. The exhibition is open free to the public, on presentation of visiting card, until April 20.

A series of seven lectures on "Modern Aspects of Helminthology" will be given at the Lister Institute by Dr. W. Nicoll on Tuesdays and Fridays, commencing March 19, at 5 p.m. These lectures will deal with the general outlines of helminthology and with the chief special problems relating to the parasitic worms of man. The course is open, without fee, to all medical men and to others interested in the subject.

On Tuesday next, March 12, Dr. T. Rice Holmes will begin a course of three lectures at the Royal Institution on "Ancient Britain," and on Thursday afternoon, March 21, Dr. F. A. Dixey will deliver the first of two lectures on "Dimorphism in Butterflies." The Friday evening discourse on March 15 will be delivered by Mr. Frederick Soddy, on "The Origin of Radium"; on March 22 by Prof. d'Arcy W. Thompson, on "The North Sea and its Fisheries"; and on March 29 by Sir J. J. Thomson, on "Results of the Application of Positive Rays to the Study of Chemical Problems."

An extra meeting of the Chemical Society was held on Thursday last, February 29, when Sir William Ramsay, K.C.B., F.R.S., delivered a memorial lecture in honour of Henri Moissan, who was born in 1852 and died in February, 1907. In introducing the lecturer, the president, Prof. Percy F. Frankland, F.R.S., stated it was fitting that the lecture held in honour of the discoverer of the most active element should be given by the discoverer of the most inert element. Sir William Ramsay referred to Moissan's early researches on the products of reduction of the oxides of the iron group and to his work on the oxides of manganese, nickel, and cobalt, and on the chromous salts. Moissan's numerous experiments on the compounds of fluorine, a series of researches which culminated in the discovery of elementary fluorine and, finally, of its isolation, and the apparatus used in this work, were described, and reference was made to the researches which led to the discovery of the method of preparing artificial diamonds.

The biology class of the University of Colorado sent Dr. Alfred Russel Wallace, O.M., F.R.S., greetings on his birthday on January 8. The February 2 issue of *Silver and Gold*, a newspaper published three times a week by the associated students of the University, publishes the reply received from Dr. Wallace, in which he says:—"From the day when I first saw a Bee-orchis (*Ophrys apifera*) in ignorant astonishment, to my first view of the great forests of the Amazon; thence to the Malay Archipelago, where every fresh island with its marvellous novelties and beauties was an additional delight, nature has afforded me an ever-increasing rapture, and the attempt to solve some of her myriad problems an ever-growing sense of mystery and awe. And now, in my wild garden and greenhouse, the endless diversities of plant life renew my enjoyments; and the ever-changing pageants of the seasons impress me more than ever in my earlier days. I sincerely wish you all some of the delight in the mere contemplation of nature's mysteries and beauties which I have enjoyed, and still enjoy."

THE Academy of Natural Sciences of Philadelphia will celebrate the centenary of its foundation on March 19, 20, and 21. An important feature of the celebration will be the publication of three commemorative volumes: an index to the scientific contents of the entire series of Proceedings and Journal, now amounting to eighty-five volumes; a detailed history of the academy by the recording secretary, Dr. Edward J. Nolan, of which the Short History contributed by him to the "Philadelphia Founders' Week Memorial Volume" in 1909 may be regarded as a Prodromus; and a quarto volume of liberally illustrated memoirs by members and correspondents. A sufficient number of contributions have been received to guarantee the success of the latter publication, and the general committee has reason to believe that the entire celebration will be an adequate recognition of the honourable record of the society as one of the most efficient agencies in the cultivation of the natural sciences in America during the past hundred years.

A MEETING was held at the Mansion House on February 28 in support of the London School of Tropical Medicine. Mr. Harcourt, Secretary of State for the Colonies, was the principal speaker. He said that in the last seven years the School has received from the Tropical Diseases Research Fund 13,000*l.* for special work in protozoology and entomology, for which separate laboratories in new buildings have recently been provided. The School has managed to save 5000*l.* as the nucleus of an endowment fund, but at least another 20,000*l.* is required to put it on a sound financial basis. It is also desired to raise 10,000*l.* for the provision of additional laboratories and residential quarters. Mr. Harcourt said it may, possibly, be asked why the Government does not itself find the necessary funds. The keepers of the national purse, he pointed out, have not been niggardly in their practical assistance to the work. The Treasury has contributed, and is contributing, for the last five years 1000*l.* per annum to the Sleeping Sickness Bureau; for five years, 1000*l.* per annum to the Entomological Research Fund; for three years, 5000*l.* per annum to Sir D. Bruce's expedition to Nyasaland to inquire into sleeping sickness; and from 1904-7, 500*l.* per annum; and from 1908 onwards, 1000*l.* per annum to the Tropical Diseases Research Fund; this amounts to 8000*l.* a year, in addition to capital donations. In addition, approximately 50,000*l.* has been spent during the last five years in investigation and suppression of sleeping sickness in Uganda.

THE Committee on Science and the Arts of the Franklin Institute, Philadelphia, Pennsylvania, made the following awards of the Elliott Cresson medal on February 7:—Dr. Alexander Graham Bell, Washington, D.C., in recognition of the value of his solution of the problem of the electrical transmission of articulate speech; Dr. S. W. Stratton, Washington, D.C., in recognition of his distinguished and directive work in physical science and metrology, and its application in the arts and industries; Dr. A. A. Michelson, Chicago, Ill., in recognition of his original and fruitful investigations in the field of physical optics; Dr. A. Noble, New York, in recognition of his distinguished achievements in the field of civil engineering; Dr. Elihu Thomson, Swampscott, Mass., in recognition of his leading and distinguished work in the industrial applications of electricity; Dr. E. W. Morley, West Hartford, Conn., in recognition of his important contributions to chemical science, and particularly of his accurate determinations of fundamental magnitudes; Dr. J. F. A. Von Baeyer, Munich, in recognition of the many important results of his extended research in organic chemistry and of his discovery of synthetic processes of great industrial value; Sir William Crookes, O.M., F.R.S., in recognition of his important discoveries in inorganic and analytical chemistry, and of his pioneer work on the discharge of electricity through gases; and Sir Henry E. Roscoe, F.R.S., in recognition of his extended and important researches in the domains of inorganic, physical, and industrial chemistry.

DR. KNIGHT DUNLAP contributes to the current number of *The Psychological Review* an account of some interesting experiments upon the sensibility of the human subject to differences in the rate of succession of stimuli in two regular series of stimuli. One of these regular series is constant, the other is varied, and the two series are presented successively, the subject having to judge which has the faster rate. The rate-threshold thus reached is compared by Dr. Dunlap with the time-threshold, *i.e.* the subject's sensibility to differences in the length of a single interval of time. As might be expected, he finds that the sensibility for rate differences is considerably more acute than that for time differences, at least under the conditions of his experiments. The writer concludes that the rate judgment is not essentially based upon a judgment of individual time intervals. His paper is especially valuable as a record of experimental methods and for careful details of the instruments employed.

FROM Mr. W. Junk, of Berlin, we have received a "Bibliographica Coleopterologica," containing nearly 4000 entries of works and papers devoted solely or partially to beetles. The actual catalogue is preceded by a useful introduction on the faunistic literature of the subject.

CONSIDERABLE interest attaches to the description by Miss D. M. A. Bate in the January number of *The Geological Magazine* of the dentition and other remains of a large mouse (rat, we should have preferred to call it) discovered by herself in a cave on the west coast of Crete. The new species (*Mus catreus*) considerably exceeds the brown rat in size, and may be compared in this respect to the great Gambian rat (*Cricetomys gambianus*); it consequently forms a second instance of a relatively gigantic rodent in the Pleistocene of the Mediterranean islands.

THE fourth number of "Behaviour Monographs," published by Messrs. Holt and Co. at Cambridge, Boston, Mass., is devoted to an account of the ecology of the pond-snails of the genus Physa, by Miss Jean Dawson. From their omnivorous habits, these snails are valuable as purifiers of the ponds in which they dwell. Their own mucus serves to assist in procuring food, since it entraps microscopic organisms of all kinds, which are then devoured by the snails, together with the mucus itself. The rudimentary eyes apparently afford no assistance in procuring food, but the head and fore part of the foot are sensitive to food-stimulus.

A NEW Polypodium from the Panama regions, described by Mr. R. Mason in an extract from the Smithsonian Miscellaneous Collections (vol. lvi., No. 24), is remarkable, because the pinnæ of the sterile fronds are entire, while those of the fertile fronds are toothed or lobed and bear the sori apparently at the tips of the teeth. Another striking feature is the variation in the fronds, due to differences in the pinnæ, which in some cases are entire or once forked, in others much branched; it is suggested that the branching is correlated with injury to the apex of the fronds, which are normally of indeterminate growth.

IN connection with afforestation on the Thirlmere estate in the Lake district, Mr. A. B. Edwards contributes to the Transactions of the Royal Scottish Arboricultural Society (vol. xxvi., part i.) an article containing some useful hints on planting at high altitudes. Three-year-old seedlings were generally selected, and planted in prepared pits. Larch formed the main bulk of the plants, but where shelter was required a belt or intermixture of Scots, Austrian, and Corsican pines has been adopted. For higher elevations fir or spruce is recommended, notably the Menzies spruce. In support of a favourable anticipation of the financial success of operations, the author quotes figures from a plantation in the same district.

THE Upper Rhine, from Basle to Mainz, is one of the chief seismic districts of Central Europe, about 400 earthquakes being recorded there between 1800 and 1895. Of the latest earthquake, that of November 16, 1911, a popular account by W. Salomon is given in *Naturwissenschaftliche Wochenschrift* for February 11. Judging from the area of greatest intensity, there would appear to be two epicentres, one near Lake Constance, the other, from forty to fifty miles farther north, in the neighbourhood of Balingen, Ebingen, and Hechingen. From the frequency of after-shocks in the latter district, and from their absence from the former, however, there appears to be some doubt whether the shock belongs to the class of twin-earthquakes.

IN Heft 5 of the *Mitteilungen aus den Deutschen Schutzgebieten*, the region of the upper basin of the Mungo River, in the Cameroon protectorate, is fully described from the geographical viewpoint by Dr. F. Thorbecke. He deals specially with the higher country round the volcano of Manenguba, which rises to an altitude of more than 2000 metres, and considers it to consist essentially of a crystalline block overlaid by basaltic or trachytic sheets of lava. This seems to have been slowly raised, subsequent faulting and volcanic action having also played an important part in producing the present surface forms. Meteorological observations for 1910 from stations in the Cameroons, Togo, and New Guinea are also contained in this volume.

THE Canadian Naval Service Act having been passed in May, 1910, the Department of Naval Service was forthwith organised with branches dealing with naval matters, fishery protection, tidal and current surveys, hydrographic survey, and wireless telegraphy. Reports on all these for the fiscal year ending March 31, 1911, have been published, and contain many points of interest. The tidal work has been previously mentioned in noticing the tidal tables which have recently been published. Hydrographic surveys were carried out on the Great Lakes, on the Atlantic and Pacific coasts, and in Hudson Bay and elsewhere. Not many details are given of methods and results, but it is stated that the local attraction of compasses reputed to exist in Hudson Bay was not substantiated. Thirty-two radio-telegraphic stations exist, and a scheme has been prepared for the establishment of a system of such stations on the Great Lakes.

IN the November (1911) number of the *Geographische Zeitschrift* Prof. Penck gives a most instructive critical comparison of the three principal German atlases—these three, the hand-atlases of Stieler, Debes, and Andree, are generally considered to stand in the foremost rank of modern topography—and the discussion of the differences between them. He notes the increasing use of the most suitable projections in place of the very limited selection formerly employed, the careful choice of scale, and greatly improved character of the representation of relief. Contour lines or layers of colour might in some cases be utilised, and the great scarcity of physical maps in most atlases, which devote their pages primarily to the distribution of man and his works on the earth's surface, is a matter which calls for consideration. In spite of much recent progress, there is always room for improvement, and there is ample scope for the scientific study of cartography; the same may be said of cartography in this country, where, however, there is much more to be done before an ideal standard is reached.

A HEAVY gale was experienced in all parts of England on March 4 and the following night, when at

Dover the wind attained the velocity of 71 miles an hour. For a long time past cyclonic disturbances have arrived in proximity to our coasts from the Atlantic with considerable frequency, but, due to the persistent high barometer over western Europe, the incoming storm systems have followed a track to the northward, skirting our western and northern coasts. The storm area which arrived on March 4 completely traversed the British Isles, and probably subsequent disturbances arriving will for a time now follow a similar path. In connection with the disturbance, a severe squall, accompanied by thunder and lightning, passed over Kew at 4.30 p.m. on March 4, when the wind attained the velocity of 60 miles an hour, and a similar squall passed over South Kensington at 4.40 p.m., the wind velocity recording 42 miles an hour. At Dover a squall, with the wind blowing 68 miles an hour, was experienced at 4 p.m., and a corresponding disturbance passed over Valencia, in Ireland, at 7.40 a.m., which gives a rate of travel of rather less than 50 miles an hour.

The past winter, comprised in the three months December, January, and February, proves to be one of the warmest experienced of recent years, notwithstanding the severe frost which occurred at the close of January and at the beginning of February. A summary of the weather for the thirteen weeks ended March 2, issued by the Meteorological Office, shows that the mean temperature for the winter was in excess of the average over the entire kingdom; the greatest excess occurred in the east and south-east of England and in the Midland counties. The aggregate rainfall for the winter was largely in excess of the average over the whole of the British Isles, except in the north of Scotland, where the deficiency amounted to 2·95 in. The greatest excess was 5·3 in., in the south-east and south-west of England. In the Midland counties the excess was 4·3 in., and in the south of Ireland 4·5 in. The rainy days were also in excess of the average everywhere, except in the north of Ireland. The duration of bright sunshine was deficient, except in the north of Scotland, but the difference from the normal was nowhere very large. At Greenwich the mean temperature was above the average in each of the three winter months, the excess being respectively 5°, 2°, and 4°; the mean for the whole period was 42·5°, which is 3° above the normal. There has only been one winter as warm in the last thirty-five years, the mean for the three months being 43·5° in the winter of 1898–9. The rainfall was also in excess of the average in each of the three months, the aggregate excess being 3·3 in. The duration of bright sunshine was in good agreement with the normal.

In the December (1911) number of the Annals of Tropical Medicine and Parasitology, issued by the Liverpool School of Tropical Medicine, some novel "Tables of Statistical Error" are given by Sir Ronald Ross and Mr. Walter Stott. The tables show, for a given true percentage, how many observations must be made in order that the odds may be *m* : 1 that the observed percentage lies within given limits. The limits taken are ±1, ±2, ±3, ±4, ±5, or ±6 per cent., the odds 99999 : 1, 9999 : 1, 999 : 1, 99 : 1, 9 : 1, and 1 : 1, and the percentages are tabulated by steps of a unit. As the calculation appears to have been made, however, on the usual basis of a normal distribution, it is not clear what meaning can be attributed to the figures given for very low percentages, where the number of observations is not nearly sufficient to justify such an assumption. The tables, which are obtainable as a separate publication, should do much to lessen the publication of results based on quite inadequate statistical data, and thus serve a very useful purpose, but the point to which we have directed attention should have received more attention in the explanatory introduction.

Mr. G. R. M. Temple sends us from York a copy of a photograph, here reproduced, which illustrates very clearly the result of the expansion of water by freezing during the recent severe frost. The bottle was filled with clean water and tightly corked; when the water had frozen a stem of ice about 4½ in. in length was found to be projecting from the neck of the bottle, as shown in the illustration. This stem represented, of course, the increase of volume undergone by the water in passing from the liquid to the solid state. The bottle must have been cracked while solidification was going on, otherwise the water would have escaped.

Protruding stem of ice formed by the freezing of water in a bottle.

The illustrated article by Prof. E. F. Northrup on a photographic study of vortex rings in liquids, published in our issue of February 1 last (vol. lxxxviii., p. 463), has prompted Mr. A. W. Ackermann to send a description of some experiments performed by him twenty years ago in the production of vortex rings in liquids. He took a cubical vaseline tin of 8·5 cm. edge, cut a hole in the lid 1 cm. in diameter, filled the tin with a solution of permanganate of potash, and placed the tin in a bath 6 ft. long. By means of a long stick impulses were given to the top or end of the tin, and the vortex rings were ejected at pleasure and studied. At Mr. Ackermann's suggestion, Prof. C. V. Boys, F.R.S., was asked if he had investigated the matter. He reminds us that the late Prof. Guthrie had a large glass trough made in the early eighties of the last century for experiments on liquid vortex rings. In the centre of one end there was a "gun" with a thick sheet india-rubber back. The gun was filled with a solution of rosaniline. Dr. Guthrie's trough was used later by Sir Arthur Rücker, F.R.S., while professor of physics at the Royal College of Science, London. Prof. Boys goes on to inform us that he would have expected that a trough wider than 12 cm., as described in Prof. Northrup's article, certainly not less than 30 cm. or a foot, would be greatly preferable, and equally that a gun with a larger muzzle than that employed would have been better.

THE annual general meeting of the Institute of Chemistry was held on March 1, Dr. George Beilby, F.R.S., the president, occupying the chair. During the course of his address the president said the fund for new buildings for the institute has reached 8500*l.*, but 15,000*l.* is considered necessary for erecting a building suitable for the work of the institute. Touching on the difficulties which confront public analysts and private practitioners, he referred to the attempts made on the part of certain local authorities to lower the status of the professional chemist by offering appointments at ridiculous remuneration. Enlightened municipal bodies realise that the proper administration of statutes, such as the Sale of Food and Drugs Act, cannot be expected unless they attract to their appointments men of competence and integrity, who can hold their own as responsible representative officers of their authorities. The Act is as much a statute against fraud as in the interests of public health, and it must be understood that the public analyst is in no way subject to the control of the medical officer of health. Prof. R. Meldola, F.R.S., was elected as president for the ensuing year, and the following as vice-presidents:—Dr. G. T. Beilby, F.R.S., Dr. F. Clowes, Dr. G. McGowan, Sir Alexander Pedler, F.R.S., Dr. J. M. Thomson, F.R.S., and Sir William Tilden, F.R.S.

THE Bulletin of the Bureau of Standards for December 15, 1911, contains an account of an investigation carried out by Mr. F. W. Grover on the effect of temperature and frequency on the capacity and phase difference of a number of commercial paraffined paper condensers. The alternating currents used were supplied by special generators designed for the Bureau. Bridge methods were used, balance being indicated by a vibration galvanometer. The phase differences found range from $6'$ to 22° of arc. The change of capacity with frequency is large for low frequencies, and decreases as the frequency increases. The temperature coefficient of capacity is generally positive and of the order 1 per cent., but in some cases may be negative. The absorption appears to be represented with a fair degree of accuracy by Von Schweidler's extension of Pellat's theory that the dielectric displacement on the application of an electric field attains instantly a certain fraction of its final value, and then increases exponentially to its final value. Three exponential terms appear to be necessary to represent the observations. It follows from these results that paper condensers cannot serve as standards of capacity, and should not be used in any work in which a constant capacity is required.

COMMENTING on the fatal accident to Mr. Graham Gilmour, *Engineering* for March 1 considers that if the trussing of his machine was after the usual pattern in this type of machine, the provision for horizontal strength would not be very great, and failure would most likely be in this direction. The essential lesson in this and previous accidents appears to be that it is high time that the question of the strength of monoplane wings was gone into in a public manner, and that it is due to the public that the makers should demonstrate that they have a reasonable factor of safety, both vertically and horizontally, otherwise the monoplane in its present state will be put down as a machine in which safety has been so far sacrificed to the craze for "records" that it is not fit for practical flight.

THERE have been several proposals within the past few years to construct internal-combustion air-compressors on the free-piston system, and one which has been made and tested by Signor Giuseppe Matricardi, of Pallanza, Lago Maggiore, Italy, is described in *Engineering* for March 1. A heavy piston is propelled from one end of a cylinder to the other end by the explosion of a gaseous mixture behind it. During its motion it expels air in front of it through a port, and thence through a non-return valve into a reservoir. Near the end of its travel the piston overruns the port, and compresses into the end of the cylinder a fresh charge, which is exploded in its turn, shooting back the piston to the other end. In its passage the piston compresses and discharges into a reservoir the air in front of it, as before. It is said that a good efficiency and large output have been secured in the small machine already tested, but actual figures are reserved until a larger compressor, now under construction, is ready and tested by independent engineers.

WE are indebted to Messrs. Cassell for a copy of the first part of a new issue of Kearton's "British Birds' Nests." The fact that bitterns nested last year in Norfolk is recorded.

THE first part of "The Nature Book," which is described in a subtitle as a popular description by pen and camera of the delights and beauties of the open air, has been published by Messrs. Cassell and Co., Ltd. The work is to be completed in thirty-six fortnightly parts, at 7*d.* net each. It is profusely illustrated from photographs and a series of coloured plates.

THE report of the ninth meeting of the International Meteorological Committee, held at Berlin in September, 1910, and of the sixth meeting of the Commission for Terrestrial Magnetism and Atmospheric Electricity, which preceded it, has just been published as a Blue-book (Meteorological Office, No. 208, price 3*s.*).

THE "Classified List of Smithsonian Publications available for Distribution, January, 1912," has been received from Washington. Applicants for these publications are requested to state the grounds of their requests, as the Smithsonian Institution is able to supply papers only as an aid to the researches in which applicants are especially interested. The papers included in the list are distributed gratis, except in some cases, where a small charge is made.